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(54) (Title of the Invention)

Wooden Flooring and Floor Structure

(57) (Abstract)

(Problem) Wooden flooring and floor structure with no creaking sounds.  
(Means for Solving the Problem) Wooden flooring 1 possessing either a tongue 2 or a groove 3 for use in a tongue-and-groove joint on edges to be joined, wherein at least one from among the tongue 2, the groove 3, the upper edge of the tongue 2, the upper edge of the groove 3, the lower edge of the tongue 2, or the lower edge of the groove 3 is provided with a sliding member 4 either continuously or intermittently over its entire length, and wherein when the adjacent flooring units 1 are joined together, measurable gaps 6 and 7 are produced between the corresponding faces where no sliding member 4 is interposed between the corresponding upper faces and the analogous corresponding lower faces of the tongue 2 and the groove 3.

[see source for figure]

A-F-000309

(Scope of Patent Claims)

(Claim 1) Wooden flooring wherein said flooring possesses either a tongue or a groove used for a tongue-and-groove joint on edges to be joined, and wherein at least one from among the tongue, the groove, the upper edge of the tongue, the upper edge of the groove, the lower edge of the tongue, or the lower edge of the groove is provided with a sliding member either continuously or intermittently over its entire length, and wherein measurable gaps will be produced where no sliding member is interposed between the corresponding upper and lower surfaces of the tongue and the groove when adjacent flooring units are joined together.

(Claim 2) A floor structure wherein multiple wooden flooring units possess either a tongue or a groove for use in a tongue-and-groove joint on edges to be joined, wherein said wooden flooring units are joined together either by fixing to a floor foundation or by attaching to floor joists in the floor structure, and wherein a sliding member will be interposed either continuously or intermittently over the entire length of at least one from among the upper faces and the lower faces of the tongue and the groove, and wherein gaps will be produced in the corresponding faces where no sliding member is interposed.

(Detailed Description of Invention)

(0001)

(Field of Industrial Application) The present invention concerns wooden flooring and floor structures.

(0002)

(Prior Art and Problem to be Solved by the Invention) When wooden flooring is affixed to a flat floor foundation of, for example, concrete or particle board, with the objective of absorbing the irregularities and deformations in the floor foundation and of improving the sound insulation, a cushioning member has been affixed to the lower surface of wooden flooring.

(0003) Figure 6 shows a prior art example in which the bottom surface of the principal wooden flooring (61a) is provided with a cushioning member (5), and a tongue-and-groove joint is effected in the wooden flooring (61) above a concrete floor foundation surface (32). At the junction of the adjacent flooring units, the upper edges (64, 65) of the tongue (62) and the groove (63) are tightly joined together. These upper edges (64, 65) possess minute irregularities and fuzziness, and the frictional resistance is unusually large. In addition, the tongue (62) easily fits into the groove (63) since it is slightly narrower. Consequently, as a walking load is applied to this type of flooring (61), the cushioning member (5) becomes compressed, and when the walking load is removed later, the cushioning member (5) can be restored. In other words, the flooring undergoes vertical motion as a result of walking. Moreover, as is shown in Figure 7, only one side of the adjacent flooring units (61) will undergo vertical motion, the frictional resistance will be large, with the effect that the upper edges (64, 65) of the tightly connected tongue (62) and groove (63) will rub against each other, making an unpleasant grinding or snapping frictional noise, these so-called creaking sounds have been a problem.

(0004) This kind of creaking sound can be produced even when the wooden flooring used has a layer of elastic material such as a cushioning material at an intermediate depth, or when a cushioning member is inserted when multiple wooden flooring units are joined together and laid down on the floor foundation. In addition, even when the wooden flooring units are attached to floor joists, when walking on the portions of the flooring which are positioned between the floor joists, these same portions will revert to normal after slight bending which will cause the flooring to undergo vertical motion, and the problematic creaking sounds will thusly be produced.

(0005) However, the creaking sounds are not produced in the junctions between adjacent flooring units alone, there are many partial contributions to the problem such as from unevenness on the other side under the floor, unevenness from the installation of the flooring, and minor imperfections due to the machining accuracy in the junctions at the edges of the flooring units that often cause the creaking.

(0006) Moreover, this type of creaking sound can be eliminated at the time of installation by inserting a spacer into the corresponding upper faces of the groove and the tongue in the flooring of adjacent flooring units, and these problems would be avoided after installation with the use of this method, but it would be necessary to prepare many such spacers, and there is a problem with the insertion and removal operation being unusually complicated and bothersome.

(0007) The objective of the present invention, being mindful of the above described problems, is to offer wooden flooring and a floor structure in which creaking sounds are not produced.

(0008)

(Means to Solve the Problem) In the wooden flooring of the present invention, said flooring possesses either a tongue or a groove for a tongue-and-groove joint on the end faces to be joined, and at least one from among a tongue, a groove, an upper edge of the tongue, an upper edge of the groove, a lower edge of the tongue, or a lower edge of the groove is provided with a sliding member either continuously or intermittently over its entire length, and when adjacent flooring units are joined together, measurable gaps will be produced where no sliding member is interposed between the corresponding upper faces and the analogous lower faces of the tongue and the groove.

(0009) According to the wooden flooring, when adjacent flooring units are being joined and the corresponding upper faces and analogous corresponding lower faces of the tongue and the groove are not yet joined together, and even if either the surface of the sliding member and the surface of the connected adjacent flooring units or the surfaces of the interconnected sliding members rub together, there is little frictional resistance on the surface of the sliding member, hardly any frictional noise is produced, and there is no concern about creaking sounds.

(0010) In addition, the floor structure of the present invention consists of multiple flooring units possessing either a tongue or a groove for a tongue-and-groove joint on the edges to be joined, and are joined together and are either laid on the floor foundation or are attached to floor joists, and on at least one among the upper corresponding faces and the analogous lower corresponding faces of the tongue and the groove, a sliding member is inserted either continuously or intermittently over its entire length, and gaps are produced on the corresponding surfaces where no sliding member is inserted.

(0011) According to the floor structure, for any from among the upper corresponding faces and the analogous lower corresponding faces of the tongue and the groove which are not connected, even if either the surface of the sliding member and the surface of the connected adjacent flooring units, or the surfaces of the interconnected sliding members rub against each other, there is very little frictional resistance, hardly any frictional noise is produced, and there is no concern about creaking sounds.

(0012) In the wooden flooring of the present invention, it is preferable to provide the sliding member to only one side of at least one from the group including the tongue and groove and the group including the lower edge of the tongue and the lower edge of the groove. In addition, in the floor structure of the present invention, it is preferable to insert the sliding member into only one from among the corresponding faces of the tongue and of the groove and their lower corresponding faces.

(0013) The aforementioned creaking sounds are not produced with this configuration of the sliding member, and the sliding member is inserted and comes face to face with either the adjacent edges of the flooring units at an intermediate depth or the underside surface of the components, so that even if the flooring expands from absorbing moisture, it is difficult to produce an upwelling in the floor surface as a result of the buckling at the junction. In addition, even when carrying out the installation, if the edge of the flooring unit, positioned on the floor foundation, is joined with the edges of the other flooring units by pressing them together, stopping at the point in time when the tongue and groove or the lower corresponding surfaces of the tongue and the groove come into contact with the inserted sliding member, it is extremely easy to set the fixed gaps between the

corresponding faces of the other two parts, and it is less cumbersome compared to the prior art method of using a spacer.

(0014)

(Embodiments of the Invention). The wooden flooring of the present invention is outfitted at a minimum with the principal wooden flooring and a sliding member.

(0015) The materials that can be used for the principal wooden flooring include plywood, medium-density fiberboard, hardboard, particle board, oriented strand board, wafer-board, laminated veneer lumber (LVL), laminated wood-type lumber, composite lumber from the combination of many types of lumber, composite lumber from the combination of multiple layers of the same type of lumber, and furthermore the aforementioned wooden lumber which has been laminated with inorganic material such as slag cement bonded fiberboard. Furthermore, composite lumber that has been finished by lamination may be used.

(0016) At an intermediate depth in the principal wooden flooring, sheets such as for sound insulation, vibrations, or cushioning may be interposed. In addition, such sheets or cushioning members may be provided on the lower surface of the instant wooden flooring. Examples that can be given of sheets for sound insulation or for vibration are high density materials (inorganic powders such as barium sulfate, and metallic powders such as lead or iron), synthetic resins such as polyethylene, polyurethane, polyvinyl chloride, and sheets made from mixtures with asphalt, and heavy aggregates mixed with an adhesive. Examples that can be given are cushioning sheets made of soft materials such as synthetic resins, flexible materials such as rubber, foams of these, spun-bonded fabric, or sheets of foam impregnated fiber, or felt or carpet sheets. These types of sheet can be provided with many perforations and through-holes. For the cushioning member, soft materials such as synthetic resins, flexible materials such as rubber, foams of these, foam filaments, non-wovens, glass wool, rock wool, insulation board, felt, carpet, natural fiber, synthetic resin fiber, metallic fiber, foam impregnated fiber, rubber or synthetic resin non-wovens and/or foams applied or in composites, possessing a sheet-form, mat-form, a form with convexities or concavities, an irregular form, a wavy surface-form, a reticulated form, a perforated panel form, or a three-dimensional cross-linked reticulated form, or any form desired for the compression deformations arising from the load. The cushioning member preferably has a thickness of 2 mm or more, is normally affixed to the inside and outside of the present flooring, but can be applied portion wise. In addition, it can be attached using staples and the like. Moreover, the cushioning member may be applied to the present flooring as a finish.

(0017) The surface of the principal wooden flooring may be supplied with a coating to have a simple wood facing, a paper facing, or a synthetic resin sheet facing, as the occasion demands, and a printed pattern or a colored coating may be applied, and in addition it may be provided with grooves as desired.

(0018) In addition, in order to prevent warping and to promote pliability and sound insulating properties, the principal wooden flooring can be provided with a number of grooves, perforations and through-holes on the back. These corresponding features may also be provided in the case of composite board. Furthermore, in composite board possessing upper and lower layers where sheets are interposed at an intermediate depth, grooves may be provided on the surface of the lower layer, on the reverse surface, or on both surfaces, and the lower layer may be partitioned with grooves.

(0019) For the sliding member, when the principal wooden flooring units from the above described materials are joined as described and rub together, extremely faint frictional noises are produced by the frictional resistance possessed by the materials, at a level inaudible to the human ear, in other words the sliding member is formed from materials that slide easily. For example, base materials such as paper, textile fabric, bonded textile on one surface impregnated with a synthetic resin such as polyethylene, polyethylene glycol, melamine resin, phenol resin, and for example a non-adhesive finish, non-bonding finish, or a mold-processed finish can preferably be applied on the same surface, but because it can adhere easily to the present flooring, in the above described finish processing the base material is applied only to one surface, and an adhesive layer or a bonding layer may be applied to the other surface. More specifically, synthetic adhesive resin tape such as craft tape,

gum tape, polyethylene, polyester, vinyl chloride, and fluororesin may be used. In addition, for the sliding member, synthetic sheets of hard or flexible material such as polyethylene, polypropylene, nylon, polyacetal, PTFE (tetrafluoroethylene), HDPE (high density polyethylene), or may be formed from an applied molded sheet such as a fluororesin finish. A sliding member from such sheets can be bonded to the present flooring with an adhesive or glue. Furthermore, a sliding member may be formed from a hot melt resin, such as molten ethylene-vinyl acetate copolymer resin, polyethylene, or polyamide resin, being applied to the appropriate part of the present flooring, and subsequently being cooled and cured. In addition, sheets, paper or filaments impregnated with hot melt resin may be used.

(0020) At least one from among the tongue, the groove, the upper edge of the tongue, the upper edge of the groove, the lower edge of the tongue, and the lower edge of the groove can be provided with this sliding member, either continuously or intermittently over its entire length. In addition to the sliding member being provided over the entire vertical width of each of the above-mentioned components, for example, it may only be provided on the upper part of each of the named components, or only be provided portionwise at an intermediate depth. Furthermore, considering the ease with which it can adhere to the principal wooden flooring, the sliding member is preferably positioned in the (bottom of the) groove. Moreover, in the example when the sliding member is being positioned on the tongue or in the groove, the other surfaces of the sliding member may also be connected during the joining process.

(0021) The edges of the principal wooden flooring are formed from either a tongue or a groove for use in a tongue-and-groove joint, but the tongue-and-groove joint referred to includes both the present tongue-and-groove joint and a tongue-and-groove joint of a lesser aspect.

(0022) The height of the tongue and the depth of the groove may be established so that gaps are produced between the corresponding faces when the flooring units are joined and a sliding member is not interposed, but it is possible to adjust the gaps according to the thickness of the sliding member. Thusly, multiple layers may be needed to achieve a satisfactory sliding member. Usually the gaps are set to be in the range 0.1 mm ~ 0.5 mm.

(0023) In order to avoid an upwelling of the floor surface that may accompany an expansion of the flooring due to moisture absorption and to make the installation easier, the aforementioned gaps are preferably produced in the upper corresponding faces of the tongue and groove, and more preferably these gaps are either increased in the corresponding faces of the tongue and groove or are produced in the lower corresponding faces.

(0024) Moreover, when gaps are produced in the upper corresponding faces of the tongue and groove, in order for these gaps not to be conspicuous, it is desirable to have appropriate coloration of the upper edge of the tongue, on the top surface of the tongue, and on the upper edge of the groove. For the coloration of these components, normally a coloring agent having the same color as the flooring surface is used to make these components darker than the flooring surface, but a coloring agent of a similar color or a different color may be used. Moreover, the square edge at the sides of the flooring surface can be chamfered, and this chamfered part can be colored in the same way as described above, so that the gaps produced in the upper corresponding faces of the tongue and groove will not be conspicuous.

(0025) Furthermore, the application can be made using any from the group including an adhesive, finishing nails, or a combination of adhesive and nails.

(0026) Next, regarding the floor structure of the present invention, first, the aforementioned flooring units are joined together, examples being that they are attached directly by means of an adhesive onto a floor foundation such as concrete or particleboard. When the bottom surface of the principal wooden flooring is not provided with a cushioning member, a cushioning member may be inserted when the flooring is laid and affixed to the floor foundation as desired. Furthermore, the aforementioned flooring units can be installed by nailing to floor joists.

(0027) Again, in the floor structure of the present invention it is desirable to have the sliding member previously bound to a specified place in the present flooring at a convenient point in the installation process, in the same way as described above for the wooden flooring; however, for example, it can be accomplished during the installation by placing the sliding member at the bottom of the groove so that it is still possible to insert the tongue.

(0028)

(Working Examples) The Working Examples of the present invention are explained by referring to the diagrams.

(0029) (Working Example 1)

This Working Example is shown in Figure 1 and Figure 2. The wooden flooring (1) is shown in graphic form, with the principal wooden flooring (1a) possessing both right and left edges for joining including the tongue (2) for the present tongue-and-groove joint and the groove (3) on the other analogous side, and with a sliding member (4) positioned at the bottom of the groove (3), and with the bottom surface of the principal wooden flooring (1a) being provided with a cushioning member (5), so that when adjacent flooring units (1) are being joined, the respective measurable gaps (6)(7) are produced between both the upper corresponding surfaces and the lower corresponding surfaces of the tongue (2) and the groove (3).

(0030) The principal wooden flooring (1a) has an upper layer (8) and a lower layer (9) of 3-ply plywood, and between them is provided a cushioning sheet (10) laminated from bonded-fiber and a natural rubber foam interposed between these layers. The upper surface of the upper layer (8) is provided with a simple wood facing (omitted in the illustration). Many grooves (11) are formed on the lower surface of the principal wooden flooring, which possess the same depth as the thickness of the lower layer (9), and a shallow V-shaped groove is formed in the middle of the upper surface. In addition, chamfering has been carried out on the square edges on the side of the surface. A colored layer (13) of the same color as the surface of flooring (1) is formed on the upper surface of the tongue (2), and on the portion of the tongue (2) containing the chamfering, and on the upper edge of groove (3). The sliding member (4) is bonded along the entire length of the bottom of groove (3) with the adhesive surface of cloth gum tape. The cushioning layer (5) is a sheet formed by laminating polyurethane foam, polyethylene foam, and spun-bonded polyester.

(0031) For this Working Example, in the junction between two flooring units (1) shown in Figure 2, if the load due to walking is increased on one side of the flooring (1) and is avoided on the other side, the surface of the corresponding sliding member (4) will rub against the tongue (2) from the first side, but because the sliding member surface has a low frictional resistance, the frictional sound will be practically inaudible. Moreover, the respective gaps (6,7) will be produced between the upper corresponding surfaces and the lower corresponding surfaces. Consequently, there will be no creaking sounds. In addition, in this Working Example, with the tongue (2) and groove (3) positioned at an intermediate depth on both flooring units (1) and coming into contact with the interposed sliding member (4), even if the flooring units swell after absorbing moisture, the degree of buckling at the junction is slight, it is difficult for an upwelling of the flooring surface to be produced. Additionally, even when carrying out the installation, if the edge of the flooring unit (1), positioned on the previous flooring foundation, is joined with the edges of all other flooring units (1) by pressing them together, stopping at the point in time when the corresponding surfaces of the tongue (2) and the groove (3) come into contact with the inserted sliding member (4), it is extremely simple to set the fixed gaps (6,7) between the corresponding surfaces of the two parts, and is desirable when compared to the prior art method of using a spacer.

(0032) (Working Example 2)

This Working Example is shown in Figure 3. The wooden flooring (21) is shown in graphic form, and differs from Working Example 1 with respect to the tongue (22) and the groove (23) being formed on the respective right and left edges of the principal wooden flooring (21a) for use together in forming the tongue-and-groove joint, and with respect to with the lower edge of tongue (22) being provided with a sliding member (4), and

with respect to when joining adjacent flooring units (21), the corresponding faces of the tongue (22) and the groove (23) and their upper corresponding faces produce the corresponding measurable gaps (26,27), and with respect to the principal wooden flooring not being provided with a cushioning sheet (10) of an intermediate thickness nor with a groove (11) on the bottom surface, but in all other respects is identical to Working Example 1.

**(0033) (Working Example 3)**

This Working Example is shown in Figure 4. In the flooring structure (30), with multiple flooring units (31) possessing both right and left edges for joining including the tongue (2) for the present tongue-and-groove joint and the groove (3) on the other analogous side, mutually joined together and affixed to a flooring foundation (32) with an inserted cushioning member (5), with a sliding member (34) interposed and extending continuously along the entire length of the corresponding faces of the tongue (2) and the groove (3), with the corresponding gaps (36,37) produced between the upper corresponding faces and the analogous lower corresponding faces of the tongue (2) and the groove (3).

**(0034)** Regarding the wooden flooring (31), the principal (31a) is identical to the wooden flooring (1) of Working Example 1, except with regard to not being provided with the cushioning sheet (10) of intermediate thickness nor with the groove (11) on the lower surface, and except with regard to not providing the cushioning member (5) on the lower surface, and except with regard to providing a sliding member (34) on the leading edge of the tongue (2). Furthermore, in the wooden flooring (31), a rib (2a) is formed on the leading edge of the tongue (2) to make it easier to fix the position of the sliding member (34). The sliding member (34) is manufactured from polyethylene, and possesses a groove (34a) on the reverse side to combine with the rib (2a), and is fixed to the leading edge of the tongue (2) by means of an adhesive.

**(0035)** This Working Example also accomplishes its operational effect in the same manner as do Working Example 1 and Working Example 2.

**(0036) Working Example 4**

This Working Example is shown in Figure 5. The floor structure (40) is shown in graphic form, and differs from the Working Example 3 with respect to the multiple flooring units (41) being affixed directly to the floor joist (42) with an adhesive and nails (omitted from diagram), and with respect to there being a tongue (22) and a groove (23) correspondingly formed on both the left and right edges of the principal wooden flooring (41a) for use together to form a tongue-and-groove joint, and with respect to a sliding member (44) being provided on the lower edge of the tongue (22), and with respect to the respective gaps (46,47) being produced between the corresponding faces and the upper corresponding faces of the tongue (22) and groove (23), and with respect to the groove (48) formed on the upper part of the lower edge of tongue (22) which combines with the horizontal projection (44a) formed at the upper part of the back of the sliding member (44), while in all other respects it is identical to Working Example 3.

**(0037)**

**(Effect of the Invention)** In the wooden flooring and floor structure of the present invention, there are corresponding surfaces of a tongue and a groove of which neither of the upper corresponding surface nor the analogous lower corresponding surface are joined, and even when a sliding member rubs against the surface of the adjacent flooring unit it is joined to, or even when the other surfaces of the sliding member that are in contact rub against each other, the frictional resistance of the surface of the sliding member will be small, almost no frictional sounds will be produced, and there will be no concern about creaking sounds.

**(simple explanation of diagrams)**

(Figure 1) shows the entire front view of Working Example 1 of the present invention.

(Figure 2) shows a partial, cross-sectional view of Working Example 1 of the present invention.

(Figure 3) shows a partial, cross-sectional view of Working Example 2 of the present invention.

(Figure 4) shows a partial, cross-sectional view of Working Example 3 of the present invention.

(Figure 5) shows a partial, cross-sectional view of Working Example 4 of the present invention.

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(Figure 6) shows a partial, cross-sectional view of Prior Art Example.

(Figure 7) shows a partial, cross-sectional view of Prior Art Example for the case where the flooring undergoes changes resulting on one side of adjacent flooring units from the addition of a walking load.

(Legend for the Explanation)

(1)(21)(31)(41)---Wooden Flooring

(2)(22)---Tongue used for a Tongue-and-Groove Joint

(3)(23)---Groove used for a Tongue-and-Groove Joint

(4)(34)(44)---Sliding Member

(6)(7)(26)(27)(36)(37)(46)(47)---Gaps in the Corresponding Faces where a Sliding Member is not Interposed

(30)(31)---Floor Structure

(32)---Floor Foundation

(42)---Floor Joist

[see source for figures]

[figure 1]

[figure 2]

[figure 3]

[figure 4]

[figure 5]

[figure 6]

[figure 7]

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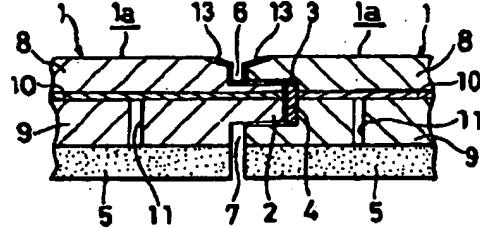
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(54)【発明の名称】木質床材および床構造

(57)【要約】

【課題】木質床材および床構造の踏み鳴りをなくす。  
【解決手段】木質床材1は、接合すべき端面に突き出用雄突2または小穴3を有し、雄突2、小穴3、雄突2上方端面、小穴3上方端面、雄突2下方端面および小穴3下方端面のうち少なくともいずれか1つに、滑り部材4を、全長にわたり連続的にまたは断続的に備え、隣接床材1との接合時、雄突2と小穴3との対向面、これらの上方対向面および両下方対向面のうち滑り部材4が介在されていない対向面に隙間6、7が生じるような寸法となされている。



## 【特許請求の範囲】

【請求項1】接合すべき端面に突はぎ用雄突または小穴を有している木質床材において、雄突、小穴、雄突上方端面、小穴上方端面、雄突下方端面および小穴下方端面のうち少なくともいすれか1つに、滑り部材を、全長にわたり連続的にまたは断続的に備え、隣接床材との接合時、雄突と小穴との対向面、これらの上方対向面および同下方対向面のうち滑り部材が介在されていない対向面に隙間が生じるような寸法となされていることを特徴とする木質床材。

【請求項2】接合すべき端面に突はぎ用雄突または小穴を有している複数の木質床材が相互に接合されて床下地に張られまたは根太に取り付けられている床構造において、雄突と小穴との対向面、これらの上方対向面および同下方対向面のうち少なくともいすれか1つの対向面に、滑り部材が、全長にわたり連続的にまたは断続的に介在され、滑り部材が介在されていない対向面に隙間が生じていることを特徴とする床構造。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、木質床材および床構造に関する。

## 【0002】

【従来の技術および発明が解決しようとする課題】木質床材を、例えばコンクリートやパーティクルボード等よりなる平面的な床下地に張るさい、床下地面の凹凸・不陸の吸収および遮音性向上の目的で、木質床材の下面に緩衝部材を貼り付けることが行なわれている。

【0003】図8は、木質床材本体(61a)の下面に緩衝部材(5)を留めた木質床材(61)をコンクリート床下地面(32)上に突はぎして施工した従来例を示している。互いに隣接した床材(61)の接合部において、雄突(62)および小穴(63)の上方端面(64, 65)は互いに強く接した状態にある。これらの上方端面(64, 65)は、細かい凹凸や、毛羽立ち等を有していて、摩擦抵抗が非常に大きい。また、雄突(62)は、小穴(63)に嵌まり易いように、小穴(63)よりもやや幅狭となされている。したがって、このような床材(61)に歩行荷重が加わると緩衝部材(5)が圧迫され、その後歩行荷重が除かれることによって緩衝部材(5)が復元する。即ち、歩行によって床材(61)が上下動することになる。そして、図7に示すように、互いに隣接した床材(61)のうち一方のみが上下動すると、摩擦抵抗が大きくかつ強く接している雄突(62)および小穴(63)の上方端面(64, 65)同士が擦れあう結果、ギギーとかバチンとかいった不快な摩擦音、即ち、踏み鳴りが生じるという問題があった。

【0004】このような踏み鳴りは、厚さの中間に緩衝材等の弹性材層を有する木質床材を用いた場合や、床下地面に敷設された緩衝部材を介して複数の木質床材を接合して設置した場合にも、生じることがあった。また、

木質床材を根太に取り付けた場合にも、根太間に位置する床材部分を歩行すると、同部分が若干揺んだり復元し、それによって床材が上下動することから、やはり踏み鳴りの問題が生じていた。

【0005】もっとも、踏み鳴りは、必ずしも床材同士の接合部の全てにおいて生じるものではなく、床下地面のバラツキ、床材の施工のバラツキ、床材端面への接合加工精度の僅かなバラツキ等によって、部分的に起ることが多い。

【0006】また、このような踏み鳴りを解消するためには、施工時に相互に隣接する床材における雄突および小穴の上方対向面にスペーサを挿入し、施工後これらを除去するといった方法も採られていたが、多くのスペーサを用意する必要があり、しかも、これらスペーサの挿入・除去作業が非常に繁雑で煩わしいという問題があつた。

【0007】本発明の目的は、以上の問題に鑑みて、踏み鳴りの生じない木質床材および床構造を提供することにある。

## 【0008】

【課題を解決するための手段】本発明による木質床材は、接合すべき端面に突はぎ用雄突または小穴を有している木質床材において、雄突、小穴、雄突上方端面、小穴上方端面、雄突下方端面および小穴下方端面のうち少なくともいすれか1つに、滑り部材を、全長にわたり連続的にまたは断続的に備え、隣接床材との接合時、雄突と小穴との対向面、これらの上方対向面および同下方対向面のうち滑り部材が介在されていない対向面に隙間が生じるような寸法となされていることを特徴とするものである。

【0009】この木質床材によれば、隣接床材との接合時、雄突と小穴との対向面、これらの上方対向面および同下方対向面のいすれもが接しないうえ、滑り部材表面とこれに接する隣接床材面、または互いに接する滑り部材表面同士が擦れ合ったとしても、滑り部材表面の摩擦抵抗が小さく、ほとんど摩擦音を生じないので、踏み鳴りのおそれがない。

【0010】また、本発明による床構造は、接合すべき端面に突はぎ用雄突または小穴を有している複数の木質床材が相互に接合されて床下地に張られまたは根太に取り付けられている床構造において、雄突と小穴との対向面、これらの上方対向面および同下方対向面のうち少なくともいすれか1つの対向面に、滑り部材が、全長にわたり連続的にまたは断続的に介在され、滑り部材が介在されていない対向面に隙間が生じていることを特徴とするものである。

【0011】この床構造によれば、雄突と小穴との対向面、これらの上方対向面および同下方対向面のいすれもが接していないうえ、滑り部材表面とこれに接する隣接床材面、または互いに接する滑り部材表面同士が擦れ合

ったとしても、滑り部材表面の摩擦抵抗が小さく、ほとんど摩擦音を生じないので、踏み鳴りのねそれがない。  
【0012】本発明による木質床材は、好みしくは、滑り部材を、雄突および小穴よりなる組と雄突下方端面および小穴下方端面よりなる組のうちいずれか1つの組の少なくとも片方のみに備えている。また、本発明による床構造は、好みしくは、滑り部材が、雄突と小穴との対向面およびこれらの下方対向面のうちいずれか一方の対向面のみに介在されている。

【0013】このように滑り部材を配置すれば、上記のように踏み鳴りを生じないうえ、互いに隣接する床材端部の厚さ中間部分同士または下面端部分同士が滑り部材を介して突き合わせられているので、床材が吸湿により伸びた場合にも、接合部の突き上げ現象による床面の盛り上がりが生じ難い。また、施工にさいしても、先に床下地等に配置された床材端部に接合すべき他の床材端部を押し付けていけば、雄突と小穴との対向面またはこれらの下方対向面が滑り部材を介して突き合わせられた時点で止まり、それによって他の2組の対向面に所定の間隔を極めて簡単に設けることができるので、スペーサーを用いていた従来技術と比べて作業が楽になる。

【0014】

【発明の実施の形態】本発明の木質床材は、少なくとも木質床材本体と滑り部材とを備えている。

【0015】木質床材本体には、合板、中質繊維板、ハーフボード、パーティクルボード、オリエンテッドストラップボード、ウエハーボード、单板積層材(LVJ)、集成材等の木質板、これらの木質板を複数組み合わせた複合板、同一種類の木質板を複数積層した複合板、さらには、繊維混入スラグセメント板等の無機質板と前記木質板とを積層した複合板等が用いられる。なお、複合板の場合、すらして積層されていてもよい。

【0016】この木質床材本体の厚さ中間に、遮音シート、耐震シート、緩衝シート等のシートが介在されているてもよい。また、これらのシートや緩衝部材が、木質床材本体の下面に備えられていてもよい。遮音・耐震シートとしては、高比重物質(植酸バリウム等の無機質粉末、鉛、鉄等の金属粉末)がポリエチレン、ポリウレタン、塩化ビニル等の合成樹脂やアスファルトに混入されてなるシート、粗質骨材混入粘岩材シート等が挙げられる。緩衝シートとしては、合成樹脂、ゴム等の軟質材、これらの発泡体、不織布、発泡体含浸織物等からなるシート、フェルト、カーペット等のシートが挙げられる。これらのシートには、複数の貫通孔や有底孔が設けられてもよい。緩衝部材としては、合成樹脂、ゴム等の軟質材、これらの発泡体、発泡体のフィラメント、不織布、グラスウール、ロックウール、インシュレーションボード、フェルト、カーペット、天然繊維、合成樹脂繊維、金属規格、発泡体含浸織物、不織布にゴムや合成樹脂あるいはこれらの発泡体を塗布したものおよびこれらの複

合体で、シート状、マット状、凸部または凹部を有するもの、凹凸状のもの、断面波状のもの、網状のもの、有孔板状のもの、立体的に交絡結合した網状のもの等、要するに荷重によって圧縮変形するものであれば何でもよい。緩衝部材の厚さは2mm以上が好みしく、通常これは床材本体の裏面全面に貼り付けられるが、部分的に貼り付けられててもよい。またステーク等により固定される場合もある。そして、緩衝部材は、床材本体に対しすらし貼りされていてもよい。

【0017】木質床材本体の表面には、必要に応じて化粧单板、化粧紙、化粧合成樹脂シート等が貼着されていてもよいし、柄模様印刷、着色塗装が施されてもよく、また溝が設けられていてもよい。

【0018】また、反り防止、柔軟性および遮音性付与のため、木質床材本体の裏面に複数の溝、貫通孔、有底孔が設けられててもよい。複合板の場合には、それそれにこれらが設けられていてもよい。なお、厚さ中間にシート等が介在されることにより複合板が上板と下板を有するものである場合、下板の表面、裏面または両面に溝を設けてもよく、溝によって下側板を分割するようにしてよい。

【0019】滑り部材は、上記材料よりも木質床材本体と当接して擦れ合ったさい、人間の耳に聞こえない程度のごく小さな摩擦音を生じるような摩擦抵抗を有する材料、即ち滑り易い材料によって形成される。例えば、紙、織布、不織布等の基材の少なくとも片面にポリエチレン、ポリエチレンクリコール、メラミン樹脂、フェノール樹脂等の合成樹脂を含浸してなるものや、両面に非粘着加工、非接着加工、難燃処理加工等が施されてなるものが挙げられるが、床材本体への固定を容易にするために、上記処理加工が基材の片面のみに施され、他方の面に粘着剤層や接着剤層が設けられているものが好みしい。具体的には、クラフトテープ、ガムテープ、ポリエチレン、ポリエスチル、塩化ビニル、ファブリケート等の合成樹脂テープ等の粘着テープが用いられる。また、滑り部材は、ポリエチレン、ポリプロピレン、ナイロン、ポリアセタール、PTEFE(四フッ化エチレン)、HDPF(高密度ポリエチレン)等の硬質または軟質合成シートや、ファブリケート等が施された難燃シートで形成されていてもよい。このようなシートよりなる滑り部材は、粘着剤や接着剤等によって床材本体に固定される。さらには、床材本体の所定箇所に溶融状態のエチレン・酢酸ビニル共重合樹脂、ポリエチレン、ポリアミド樹脂等のホットメルト樹脂を塗布した後、これを冷却硬化させることによって、滑り部材を形成してもよい。その他、ホットメルト樹脂を含浸したシート、紙、糸等で形成されてよい。

【0020】この滑り部材は、雄突、小穴、雄突上方端面、小穴上方端面、雄突下方端面および小穴下方端面のうち少なくともいずれか1つに、全長にわたり連続的に

または断続的に備えられていればよい。また、滑り部材は、上記各部分の上下端全体にわたって備えられる他、例えば各部分の上部のみ、幅中间部のみ等のように部分的に備えられていてもよい。なお、木質床材本体への固定の容易性を考慮すると、滑り部材は小穴(6)の底に備えられるのが好ましい。また、例えば雄実および小穴のいずれにも滑り部材を備えて、接合時に滑り部材の表面同士が当接するようにしてもよい。

【0021】木質床材本体の端面には、実はぎ用の雄実または小穴が形成されているが、ここにいう実はぎには、本実はぎと相じゃく実はぎとが含まれる。

【0022】雄実の長さおよび小穴の深さは、床材同士を接合したさい、滑り部材が介在されていない対向面に隙間が生じるよう設定されればよいが、この隙間は、滑り部材の厚みによっても調整可能である。したがって、必要に応じて滑り部材を複数層にしてもよい。隙間は、通常は0.1mm~0.5mmの範囲に設定される。

【0023】上記の隙間は、床材の吸湿伸長に伴う床面の盛り上がりを防止しつつ施工を容易にするために、好ましくは、雄実および小穴の上方対向面に、より好ましくは、それに加えて雄実と小穴との対向面またはこれらの下方対向面に生じるようになされている。

【0024】また、雄実および小穴の上方対向面に隙間が生じるようした場合、この隙間を自立しないようにするために、雄実の上方端面、雄実上面および小穴の上方端面が、それぞれ着色されているのが好ましい。これらの部分への着色は、通常、床材表面と同色の着色剤を用いて床材表面よりも濃くなるように行なわれるが、床材表面と同系色や異色の着色剤を用いてもよい。また、床材本体の表面側の角線部に面取りが施され、かつこの面取り部が上記と同様に着色されることにより、雄実および小穴の上方対向面の隙間をさらに目立たなくすることができる。

【0025】なお、施工は、接着施工、釘止め施工、糊剤併用施工のいずれでもよい。

【0026】次に、本発明の床構造としては、まず、複数の上記木質床材が、相互に接合されて、コンクリート下地、パーティクルボード下地等の床下地に接着等により直接設かれているものが挙げられる。また、木質床材本体の下面に緩衝部材を備えていない場合には、床下地に設置された緩衝部材を介して床下地に張られていてよい。さらには、複数の上記木質床材が板太に釘等によって取り付けられていてよい。

【0027】また、本発明の床構造において、滑り部材は、上記木質床材と同様に床材本体の所定箇所に予め固定されているのが施工の容易性の点で好ましいが、例えば、施工のさいに、床材の小穴の底部に滑り部材を配置しておいてから雄実を差し込むようにすることも可能である。

## 【0028】

【実施例】本発明の実施例を図面を参照して説明する。

## 【0029】実施例1

この実施例は、図1および図2に示されているものである。図示の木質床材(1)は、接合すべき左右両端面のうち一方に本実はぎ用雄実(2)を同他方に小穴(3)を有する木質床材本体(1a)と、小穴(3)の底部に備えられた滑り部材(4)と、木質床材本体(1a)の下面に備えられた緩衝部材(5)とによりなり、隣接床材(1)との接合時、雄実(2)および小穴(3)の上方対向面ならびに同下方対向面にそれぞれ隙間(6)(7)が生じるような寸法となされているものである。

【0030】木質床材本体(1a)は、3プライ合板よりなる上板(8)および下板(9)と、これらの間に介在されかつ不織布と天然ゴム発泡体とを積層してなる緩衝シート(10)とを備える。上板(8)上面には化粧单板(図示略)が備えられている。木質床材本体(1a)の下面には、これの下板(9)の厚みと同じ深さを有する複数の溝(11)が形成され、一方、上面の幅中央部に、浅いV溝(12)が形成されている。また、表面側角線部には、面取りが施されている。雄実(2)上面ならびに面取り部を含む雄実(2)および小穴(3)の上方端面には、それぞれ床材(1)表面と同色の着色層(13)が形成されている。滑り部材(4)は、布ガムテープによりなり、その粘着面によって小穴(3)の底部に全長にわたって接着されている。緩衝部材(5)は、ポリウレタン発泡体とポリエチレン発泡体とポリエチル不織布とを積層してなるシートによって形成されている。

【0031】この実施例では、図2に示す床材(1)同士の接合部において、一方の床材(1)側に歩行荷重が加わる際およびこれが除かれ際に、それぞれ滑り部材(4)の表面が雄実(2)の先端面と擦れ合ひ、滑り部材(4)表面の摩擦抵抗が小さいため摩擦音はほとんど聞こえない。しかも、これらの上方対向面および下方対向面にはそれぞれ隙間(6,7)が生じている。したがって、踏み鳴りが生じない。また、この実施例では、隣床材(1)の厚さ中間に位置する雄実(2)と小穴(3)とが滑り部材(4)を介して突き合わせられているので、床材(1)が吸湿により伸びた場合にも、接合部の突き上げの度合が少なく、床面の盛り上がりが生じ難い。さらに、施工にさいしても、先に床下地等に配置された床材(1)端部に接合すべき他の床材(1)端部を押し付けていけば、雄実(2)と小穴(3)との対向面が滑り部材(4)を介して突き合わせられた時点で止まり、それによって他の2組の対向面に所定の隙間(6,7)を極めて簡単に設けることができる。スペースを用いていた従来方法と比べて楽である。

## 【0032】実施例2

この実施例は、図3に示されているものである。図示の木質床材(21)は、木質床材本体(21a)の左右両端面にそれぞれ形成された雄実(22)および小穴(23)が相じゃくり

実はぎ用のものである点、滑り部材(4)を雄実(22)の下方端面に備えており、隣接床材(21)との接合時、雄実(22)と小穴(23)との対向面およびこれらの上方対向面にそれぞれ隙間(26, 27)が生じるような寸法となされている点、木質床材本体(21a)が厚さ中間の緩衝シート(10)および下面の溝(11)を備えていない点で実施例1と異なり、その他は実施例1と同じである。

## 【0033】実施例3

この実施例は、図4に示されているものである。図示の床構造(30)は、接合すべき左右両端面のうち一方に本実はぎ用雄実(2)を同他方に小穴(3)を有している複数の木質床材(31)が、相互に接合されて、コンクリート床下地(32)に緩衝部材(5)を介して据られており、雄実(2)と小穴(3)との対向面に滑り部材(34)が全長にわたり連続的に介在され、雄実(2)および小穴(3)の上方対向面および同下方対向面にそれぞれ隙間(36, 37)が生じているものである。

【0034】木質床材(31)は、これの本体(31a)が厚さ中間の緩衝シート(10)および下面の溝(11)を備えていない点、下面に緩衝部材(5)を備えていない点、滑り部材(34)が雄実(2)の先端部に備えられている点を除いて、実施例1の木質床材(31)と同じである。なお、この木質床材(31)において、雄実(2)の先端部には、滑り部材(34)の位置決めを容易にするためにリブ(2a)が形成されている。滑り部材(34)は、ポリエチレン製であって、これの裏面にリブ(2a)と嵌め合わせられる溝(34a)を有しており、接着剤によって雄実(2)先端部に固定されている。

【0035】この実施例も、実施例1および実施例2と同様の作用効果を有する。

## 【0036】実施例4

この実施例は、図5に示されているものである。図示の床構造(40)は、複数の木質床材(41)が接着剤と釘(図示略)によって根太(42)に直接取り付けられている点、木質床材本体(41a)の左右両端面にそれぞれ形成された雄実

\*実(22)および小穴(23)が相じゃくり実はぎ用のものである点、滑り部材(44)を雄実(22)の下方端面に備えており、雄実(22)と小穴(23)との対向面およびこれらの上方対向面にそれぞれ隙間(46, 47)が生じている点、雄実(22)の下方端面の上部に溝(48)が形成されるとともに、これに嵌め入れられる水平突部(44a)が滑り部材(44)の上部裏面に形成されている点で実施例3と異なり、その他は実施例3と同じである。

## 【0037】

【発明の効果】本発明の木質床材および床構造によれば、雄実と小穴との対向面、これらの上方対向面および同下方対向面のいずれもが接していないうえ、滑り部材表面とこれに接する隣接床材面、または互いに接する滑り部材表面同士が複数合ったとしても、滑り部材表面の摩擦抵抗が小さく、ほとんど摩擦音を生じないので、踏み鳴りのおそれがない。

## 【図面の簡単な説明】

【図1】本発明の実施例1を示す全体正面図である。

【図2】本発明の実施例1を示す部分断面図である。

【図3】本発明の実施例2を示す部分断面図である。

【図4】本発明の実施例3を示す部分断面図である。

【図5】本発明の実施例4を示す部分断面図である。

【図6】従来例を示す部分断面図である。

【図7】従来例において、隣接床材の一方に歩行荷重が加わったさいの床材の状態を示す部分断面図である。

## 【符号の説明】

(1)(21)(31)(41)…木質床材

(2)(22)…実はぎ用雄実

(3)(23)…実はぎ用小穴

(4)(34)(44)…滑り部材

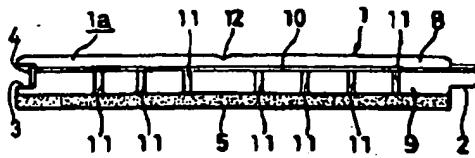
(5)(7)(26)(27)(36)(37)(46)(47)…滑り部材が介在されていない対向面の隙間

(30)(31)…床構造

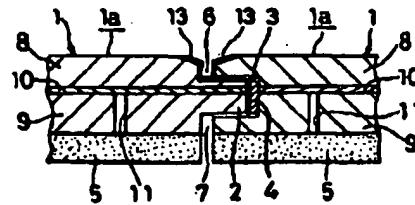
(32)…床下地

(42)…根太

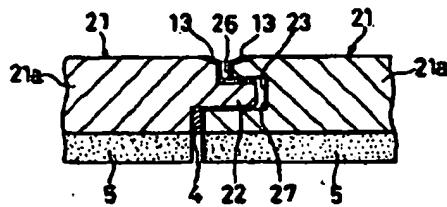
【図1】



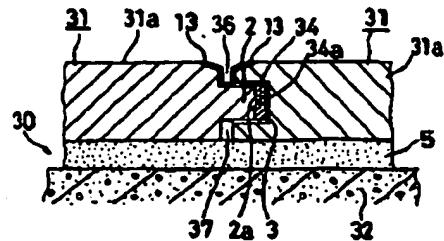
【図2】



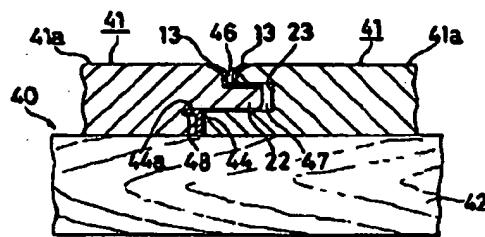
[図3]



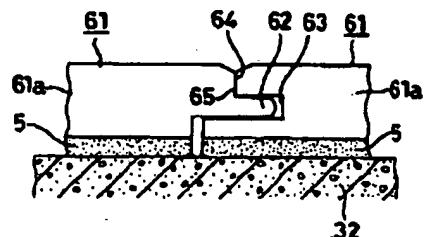
[図4.]



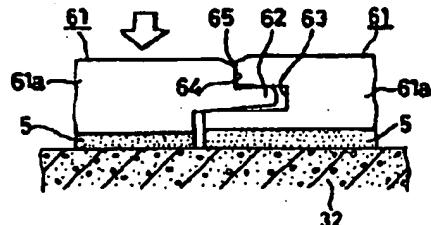
[図5.]



[図6.]



[図7.]



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